FACT SHEET FOR NPDES PERMIT
NO. WA-002239-0

CITY OF OROVILLE
PUBLICLY-OWNED TREATMENT WORKS

SUMMARY

The City of Oroville is seeking reissuance of its National Pollutant Discharge Elimination System (NPDES) Permit for its Publicly-Owned Treatment Works (POTW). The POTW consists of approximately 8.1 miles of sewers, 5 lift stations, and a wastewater treatment plant. The treatment plant provides secondary-level treatment utilizing an activated sludge process, discharging treated wastewater through a submerged outfall into the Similkameen River. Since issuance of the previous permit in 1998, the chlorine disinfection system was replaced with an ultraviolet system and a new influent screen was installed. The City's record of compliance is excellent. During the previous permit cycle the treatment plant consistently discharged high-quality effluent.

This permit contains several modifications from the previous permit. The changes were largely driven by the Department of Ecology's (Department's) Total Maximum Daily Load (TMDL) Studies to address non-attainment of water quality standards for Arsenic in the Similkameen River, and DDT and PCB in the Okanogan River. The comprehensive assessment program undertaken as part of the TMDL Study to address Arsenic found concentrations of approximately 3 µg/L in the City's drinking water supply and treatment plant effluent. A maximum daily effluent limit of 10 µg/L, based on the Safe Drinking Water Act standard, was placed in this permit. A quarterly effluent monitoring requirement is included in this permit to verify compliance with the effluent limit.

Similarly, as part of a separate TMDL Study to address non-attainment of DDT and PCB water quality criteria in the Okanogan River, DDT was found in the treatment plant sludge and effluent, and PCB was found in the sludge. However, from a regulatory perspective, the presence of DDT and PCB is a more complex situation because both of these highly toxic substances have been banned since the 1970s. DDT was used extensively for pest control on the area agricultural lands and forests from the mid-1940s to the early-1970s. In the opinion of the Department, the most desirable solution is to identify the source of these pollutants and reduce or eliminate their entry into the POTW. For these reasons, in lieu of numerical effluent limits, this permit requires the City to conduct a study to identify and work to reduce or eliminate DDT and PCB from entering the POTW.

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INTRODUCTION

The Federal Clean Water Act (FCWA, 1972, and later modifications, 1977, 1981, and 1987) established water quality goals for the navigable (surface) waters of the United States. One of the mechanisms for achieving the goals of the Clean Water Act is the National Pollutant Discharge Elimination System of permits (NPDES permits), which is administered by the Environmental Protection Agency (EPA). The EPA has authorized the State of Washington to administer the NPDES permit program. Chapter 90.48 RCW defines the Department of Ecology's authority and obligations in administering the wastewater discharge permit program.

The regulations adopted by the State include procedures for issuing permits (Chapter 173-220 WAC), technical criteria for discharges from municipal wastewater treatment facilities (Chapter 173-221 WAC), water quality criteria for surface and ground waters (Chapters 173-201A and 200 WAC), and sediment management standards (Chapter 173-204 WAC). These regulations require that a permit be issued before discharge of wastewater to waters of the State is allowed. The regulations also establish the basis for effluent limitations and other requirements which are to be included in the permit. One of the requirements (WAC 173-220-060) for issuing a permit under the NPDES permit program is the preparation of a draft permit and an accompanying fact sheet. Public notice of the availability of the draft permit is required at least thirty days before the permit is issued (WAC 173-220-050). The fact sheet and draft permit are available for review (see Appendix A--Public Involvement of the fact sheet for more detail on the Public Notice procedures).

The fact sheet and draft permit have been reviewed by the Permittee. Errors and omissions identified in this review have been corrected before going to public notice. After the public comment period has closed, the Department will summarize the substantive comments and the response to each comment. The summary and response to comments will become part of the file on the permit and parties submitting comments will receive a copy of the Department's response. The fact sheet will not be revised. Comments and the resultant changes to the permit will be summarized in Appendix D--Response to Comments.

GENERAL INFORMATION	
Applicant	City of Oroville
Facility Name and Address	City of Oroville Wastewater Treatment Plant First Avenue and Juniper Oroville, WA 98844
Type of Treatment:	Activated Sludge and Ultraviolet (UV) Disinfection
Discharge Location	Similkameen River, River Mile 4.0 Latitude: 48° 55' 32" N Longitude: 119° 26' 29" W
Water Body ID Number	WA-49-1030 (Old) ND93YI (New)

BACKGROUND INFORMATION

DESCRIPTION OF THE FACILITY

History

The City of Oroville (City) is located in northern Okanogan County near the Canadian border along State Route 97. The City's Publicly-Owned Treatment Works (POTW) is located on the southwest edge of the City and was originally constructed in 1949 as a trickling filter facility. In 1977, the POTW was upgraded to the present oxidation ditch technology with an outfall into the Similkameen River.

Collection System Status

The City's collection system was originally constructed during 1950-1956. In 1976-1979, the collection system was upgraded and repaired and now consists of approximately 8.1 miles of piping. In general, the POTW influent flows typically increase as the groundwater table rises, with July through October being the months of highest average daily flows, which indicates some correlation with inflow and infiltration (I&I) problems.

Treatment Processes

The City's treatment plant consists of an influent lift station, headworks with a mechanical fine screening unit, an oxidation ditch with two brush rotors, two secondary clarifiers, ultraviolet (UV) disinfection, a settling basin converted from the former chlorine contact chamber, an

aerobic sludge holding tank, sludge drying beds, and an operations building. The operations building houses the laboratory and electrical controls. The UV disinfection system became operational in July 2000. Effluent pressure filters were constructed as part of the 1977 upgrade, but have since been taken out of service because they were determined to be unnecessary.

Discharge Outfall

Secondary treated and disinfected effluent is discharged from the facility via an 18-inch diameter outfall line which extends approximately 120 feet offshore and terminates as an 18-foot long diffuser with 17 ports. The outfall lies approximately 2 to 3 feet below the surface of the Similkameen River at River Mile 4.0.

Compliance Sampling and Flow Monitoring

Influent and effluent compliance sampling is provided by 24-hour composite samplers. Flow volumes are measured with an ultrasonic flow meter, which also provides flow pacing data to the UV unit to maximize the disinfection process.

Residual Solids

The treatment facilities remove solids during the treatment of the wastewater at the headworks (grit and screenings), and at the secondary clarifiers, in addition to incidental solids (rags, scum, and other debris) removed as part of the routine maintenance of the equipment. Grit, rags, scum and screenings are drained and disposed of as solid waste at the local landfill.

Biosolids removed from the secondary clarifiers are treated and land applied on 40 acres of City-owned land located near the airport under a permit from the Okanogan County Health District.

PERMIT STATUS

The previous permit for this facility was issued on December 30, 1998. The previous permit placed effluent limitations on 5-day Biochemical Oxygen Demand (BOD_5), Total Suspended Solids (TSS), pH, and Fecal Coliform Bacteria.

An application for permit renewal was received by the Department on April 22, 2003 and accepted by the Department on May 23, 2003.

SUMMARY OF COMPLIANCE WITH THE PREVIOUS PERMIT

A compliance inspection without sampling was conducted on May 15, 2003.

During the history of the previous permit, the Permittee has remained in compliance, based on Discharge Monitoring Reports (DMRs) submitted to the Department and inspections conducted by the Department.

During the previous permit cycle (1999-2003), the Department issued one Administrative Order to the City. Order No. DE 00WQCR-1177, issued on May 25, 2000, granted the City's request for a one-month extension of a permit requirement to achieve compliance with very stringent water quality-based chlorine effluent limits. The City needed the extra time to complete construction of the UV system.

WASTEWATER CHARACTERIZATION

The concentration of pollutants in the discharge was reported in the NPDES application and in discharge monitoring reports.

Influent

Conventional Pollutant Loadings

Average monthly influent characterization data are presented Table 1 in comparison to design loadings. Data reflect influent loadings reported in DMRs for the period from January through December 2002.

Table 1: Characterization of Influent Loadings

Parameter	One-year Average	Highest Monthly Loading	Percent of Monthly Design Loading	Maximum Monthly Design Loading
Flow, in MGD	0.16	0.20	40	0.5
BOD_5, in lbs/day	269	343	43	800
TSS, in lbs/day	295	354	44	800

Effluent

The concentration of pollutants in the discharge was reported in the NPDES application and DMRs submitted to the Department. In the case of pollutants limited in the previous permit, the characterization is given in the context of the permit limit.

Conventional Pollutants

Average monthly effluent concentrations are characterized for 2000 from DMR data submitted to the Department by the City.

Table 2: Characterization of Effluent BOD, TSS and Fecal Coliform Bacteria

Parameter	One-year Average	Highest Monthly Average	Monthly Permit Limits
BOD_5, in mg/L	3.3	9	30
TSS, in mg/L	5.9	8	30
Fecal Coliform Bacteria, in #colonies/100 mL	10	27	200

During 2002 effluent pH in the discharge ranged from a minimum of 7.6 to a maximum of 8.1.

Dissolved Oxygen and Temperature

Although Dissolved Oxygen (DO) and Temperature were not effluent constituents regulated by the previous permit, reasonable potential analyses were done in the development of this permit to determine if limits are warranted in this permit. These constituents are characterized in Table 3 for 2002.

Table 3: Characterization of Effluent DO and Temperature

Parameter	One-year Average	Highest/Lowest Reported Value
DO, in mg/L	6.0	3.3 (Lowest)
Temperature, in ºC	16.6	24 (Highest)

Ammonia and Total Residual Chlorine

In the previous permit, average monthly and maximum daily effluent limits were established for Ammonia and maximum daily effluent limits were established for Total Residual Chlorine. Chlorine has not been used since the UV disinfection system became operational in July 2000; therefore, neither this fact sheet nor the permit will address Chlorine further. Concerning effluent Ammonia, due to the excellent nitrification/denitrification characteristics of oxidation ditches, and the very low concentrations reported by the City in its DMRs, the required monitoring frequency has been reduced to four times per year. (In addition, due to the low effluent concentrations there was no reasonable potential to exceed the water quality criteria for Ammonia and, consequently, no effluent limits for this parameter.)

During 2000, Ammonia was present only once above the method detection level of 0.07 mg/L, when the City reported a concentration of 0.28 mg/L on its October DMR.

Priority Pollutants

The City is not required to test its influent for priority pollutants, due to the small design loadings of its treatment plant and the primarily domestic nature of the discharges to its collection system. However, at this time (summer 2003), the Department is conducting a Total Maximum Daily Load (TMDL) Study on the Similkameen River to address exceedances of the State's Surface Water Quality Standards for Arsenic. Similarly, the Department is conducting a separate TMDL Study on the Okanogan River and its tributaries for DDT, PCB and their metabolites. The Similkameen River empties into the Okanogan River approximately 4 miles downstream from the City's outfall.

As part of the comprehensive sampling programs in support of the TMDLs, the effluent and sludge of the Oroville treatment plant were sampled. DDT and its metabolites were present in both effluent samples and the sludge sample. PCB and its metabolites were not present in the effluent samples, but were found in the sludge.

Sampling conducted in support of the Arsenic TMDL revealed the presence of Arsenic in the effluent. The treatment plant's sludge was not sampled. For reasons of continuity in this fact sheet, characterization of these pollutants, a discussion of their impacts to water quality and related permit requirements are contained in the section of this fact sheet titled **SURFACE WATER QUALITY-BASED EFFLUENT LIMITATIONS**.

SEPA COMPLIANCE

The project to replace the chlorination system with the UV system underwent a SEPA assessment in the Autumn of 1999. The lead agency was the City's Planning Department. A Determination of Non-Significance (DNS) was issued on September 9, 1999.

PERMIT LIMITATIONS

Federal and State regulations require that effluent limitations set forth in a NPDES permit must be either technology- or water quality-based. Technology-based limitations for municipal discharges are set by regulation (40 CFR 133, and Chapters 173-220 and 173-221 WAC). Water quality-based limitations are based upon compliance with the Surface Water Quality Standards (Chapter 173-201A WAC), Ground Water Standards (Chapter 173-200 WAC), Sediment Quality Standards (Chapter 173-204 WAC) or the National Toxics Rule (Federal Register, Volume 57, No. 246, Tuesday, December 22, 1992.) The most stringent of these types of limits must be

chosen for each of the parameters of concern. Each of these types of limits is described in more detail below.

The limits in this permit are based in part on information received in the application. The effluent constituents in the application were evaluated on a technology- and water quality-basis. The limits necessary to meet the rules and regulations of the State of Washington were determined and included in this permit. Ecology does not develop effluent limits for all pollutants that may be reported on the application as present in the effluent. Some pollutants are not treatable at the concentrations reported, are not controllable at the source, are not listed in regulation, and do not have a reasonable potential to cause a water quality violation. Effluent limits are not always developed for pollutants that may be in the discharge but not reported as present in the application. In those circumstances the permit does not authorize discharge of the non-reported pollutants. Effluent discharge conditions may change from the conditions reported in the permit application. If significant changes occur in any constituent, as described in 40 CFR 122.42(a), the Permittee is required to notify the Department of Ecology. The Permittee may be in violation of the permit until the permit is modified to reflect additional discharge of pollutants.

DESIGN CRITERIA

In accordance with WAC 173-220-150 (1)(g), flows or waste loadings shall not exceed approved design criteria.

The design criteria for this treatment facility are taken from Sheet G2 of the Ultraviolet Disinfection and Headworks Screen Facilities Plans and Specifications, prepared by Gray & Osborne, Inc., and are as follows:

Table 4: Design Standards for City of Oroville WWTP

Parameter	Design Quantity
Monthly average flow (max. month)	0.5 MGD
BOD_5 influent loading	800 lbs/day
TSS influent loading	800 lbs/day

The previous permit contained a maximum monthly flow design criterion of 0.493 MGD, based on the design criterion in the September 1996 Plan to Maintain Adequate Capacity (PMAC). However, the more-recent, Department-approved Disinfection and Headworks Plans and Specs contains the 0.5 MGD value, and this is the value used in this fact sheet and the associated permit.

TECHNOLOGY-BASED EFFLUENT LIMITATIONS

Municipal wastewater treatment plants are a category of discharger for which technology-based effluent limits have been promulgated by Federal and State regulations. These effluent limitations are given in the Code of Federal Regulations (CFR) 40 CFR Part 133 (Federal) and in

Chapter 173-221 WAC (State). These regulations are performance standards that constitute all known available and reasonable methods of prevention, control, and treatment for municipal wastewater.

The following technology-based limits for pH, fecal coliform, BOD_5, and TSS are taken from Chapter 173-221 WAC are:

Table 5: Technology-based Limits

Parameter	**Limit**
pH:	shall be within the range of 6 to 9 standard units.
Fecal Coliform Bacteria	Monthly Geometric Mean = 200 organisms/100 mL Weekly Geometric Mean = 400 organisms/100 mL
BOD_5 (concentration)	Average Monthly Limit is the most stringent of the following: - 30 mg/L - may not exceed fifteen percent (15%) of the average influent concentration Average Weekly Limit = 45 mg/L
TSS (concentration)	Average Monthly Limit is the most stringent of the following: - 30 mg/L - may not exceed fifteen percent (15%) of the average influent concentration Average Weekly Limit = 45 mg/L

The following technology-based mass limits are based on WAC 173-220-130(3)(b) and 173-221-030(11)(b).

Monthly effluent mass loadings (lbs/day) for BOD and TSS were calculated as the maximum monthly influent design loading (800 lbs/day) x 0.15 = 120 lbs/day.

The weekly average effluent mass loading is calculated as 1.5 x monthly loading = 180 lbs/day.

SURFACE WATER QUALITY-BASED EFFLUENT LIMITATIONS

In order to protect existing water quality and preserve the designated beneficial uses of Washington's surface waters, WAC 173-201A-060 states that waste discharge permits shall be conditioned such that the discharge will meet established Surface Water Quality Standards. The Washington State Surface Water Quality Standards (Chapter 173-201A WAC) is a State regulation designed to protect the beneficial uses of the surface waters of the State. Water quality-based effluent limitations may be based on an individual waste load allocation (WLA) or on a WLA developed during a basin-wide total maximum daily loading study (TMDL).

Numerical Criteria for the Protection of Aquatic Life

"Numerical" water quality criteria are numerical values set forth in the State of Washington's Water Quality Standards for Surface Waters (Chapter 173-201A WAC). They specify the levels of pollutants allowed in a receiving water while remaining protective of aquatic life. Numerical criteria set forth in the Water Quality Standards are used along with chemical and physical data for the wastewater and receiving water to derive the effluent limits in the discharge permit. When surface water quality-based limits are more stringent or potentially more stringent than technology-based limitations, they must be used in a permit.

Numerical Criteria for the Protection of Human Health

The State was issued 91 numeric water quality criteria for the protection of human health by the U.S. EPA (EPA 1992). These criteria are designed to protect humans from cancer and other disease and are primarily applicable to fish and shellfish consumption and drinking water from surface waters.

Narrative Criteria

In addition to numerical criteria, "narrative" water quality criteria (WAC 173-201A-030) limit toxic, radioactive, or deleterious material concentrations below those which have the potential to adversely affect characteristic water uses, cause acute or chronic toxicity to biota, impair aesthetic values, or adversely affect human health. Narrative criteria protect the specific beneficial uses of all fresh (WAC 173-201A-130) and marine (WAC 173-201A-140) waters in the State of Washington.

Antidegradation

The State of Washington's Antidegradation Policy requires that discharges into a receiving water shall not further degrade the existing water quality of the water body. In cases where the natural conditions of a receiving water are of lower quality than the criteria assigned, the natural conditions shall constitute the water quality criteria. Similarly, when receiving waters are of higher quality than the criteria assigned, the existing water quality shall be protected. More information on the State Antidegradation Policy can be obtained by referring to WAC 173-201A-070.

Critical Conditions

Surface water quality-based limits are derived for the waterbody's critical condition, which represents the receiving water and waste discharge condition with the highest potential for adverse impact on the aquatic biota, human health, and existing or characteristic water body uses.

Mixing Zones

The Water Quality Standards allow the Department of Ecology to authorize mixing zones around a point of discharge in establishing surface water quality-based effluent limits. Both "acute" and "chronic" mixing zones may be authorized for pollutants that can have a toxic effect on the aquatic environment near the point of discharge. The concentration of pollutants at the boundary of these mixing zones may not exceed the numerical criteria for that type of zone. Mixing zones can only be authorized for discharges that are receiving all known, available, and reasonable methods of prevention, control and treatment (AKART) and in accordance with other mixing zone requirements of WAC 173-201A-100.

The National Toxics Rule (EPA, 1992) allows the chronic mixing zone to be used to meet human health criteria.

Description of the Receiving Water

The facility discharges to the Similkameen River, which is designated as a Class A receiving water in the vicinity of the outfall. There are no other known nearby point source outfalls. Significant nearby non-point sources of pollutants include runoff from agricultural lands and undocumented stormwater discharges. Characteristic uses include the following:

> water supply (domestic, industrial, agricultural); stock watering; fish migration; fish rearing, spawning and harvesting; wildlife habitat; primary contact recreation; sport fishing; boating and aesthetic enjoyment; commerce and navigation. Water quality of this class shall meet or exceed the requirements for all or substantially all uses.

According to the current (1998) 303(d) list, this segment of the river is considered water quality-impaired for Arsenic and Temperature. In the case of Arsenic, the listing is based on non-attainment of the human health criteria. At present, the Department is conducting a TMDL Project to address the Arsenic problem. According to the TMDL Technical Report, the major source of Arsenic appears to be tailings from historical mining activity in British Columbia (A Total Maximum Daily Load Evaluation for Arsenic in the Similkameen River, p.v). Approximately 90 percent of the watershed is located in British Columbia. At this time, the Temperature TMDL has not been scheduled.

Although the segment of the Similkameen River to which the Oroville treatment plant discharges is not 303(d)-listed for DDT or PCB, the Similkameen River discharges into the Okanogan River approximately 4 miles downstream of the outfall. At times, the Similkameen River flow volume can be four times that of the Okanogan River. The Oroville treatment plant was included in the Okanogan River TMDL Study for DDT and PCB because the Similkameen River is a significant discharger to the Okanogan River.

Both DDT and PCB are environmentally pervasive, fat soluble and bioaccumulate in fish tissue. DDT was banned by the US EPA in 1972 for all uses except emergencies. PCBs were banned by US EPA in 1979 due to concerns about human carcinogenicity. PCBs were used as heat transfer fluids, wax and pesticide extenders, plasticizers and several other applications.

The mainstem Okanogan River is 303(d)-listed for DDT and PCBs based on *fish bioassays* conducted in the mid-1990's. However, the 303(d) DDT listings for three tributaries to the river are based on exceedances of the water quality criteria in the *water column*.

The Draft TMDL Report addressing DDT and PCB found that tributaries and sewage treatment plants contribute only about 200 mg/day of total DDTs (t-DDT) and 1 mg/day t-PCB to the mainstem Okanogan River, compared to measured DDT concentrations of 1,500 - 4,300 mg/day and no measurable PCBs on the lower river (Abstract, p.3). The TMDL Report concluded that the Okanogan River continues to be dosed with contaminated Osoyoos Lake sediments which are re-suspended and transported downstream during high flow episodes (p. 48). The source of PCBs is more problematic, and due to the difficulty in detecting them in the water column, no serious efforts were made by the investigators to determine the sources of this contaminant (p. 38).

Surface Water Quality Criteria

Applicable criteria are defined in Chapter 173-201A WAC for aquatic biota. In addition, U.S. EPA has promulgated human health criteria for toxic pollutants (EPA 1992). Criteria for this discharge are summarized below:

Table 6: Applicable Water Quality Criteria

Parameter	Criteria
Fecal Coliforms	100 organisms/100 mL maximum geometric mean
Dissolved Oxygen	8 mg/L minimum
Temperature	18 degrees Celsius maximum or incremental increases above background
pH	6.5 to 8.5 standard units
Turbidity	less than 5 NTUs above background
Toxics	No toxics in toxic amounts (see Appendix C for numeric criteria for toxics of concern for this discharge)

Consideration of Surface Water Quality-Based Limits for Numeric Criteria

Pollutant concentrations in the discharge exceed water quality criteria with technology-based controls which the Department has determined to be AKART. A mixing zone is authorized in

accordance with the geometric configuration, flow restriction, and other restrictions for mixing zones in Chapter 173-201A WAC and are defined as follows:

Dilution Factors

Three methodologies were used in determining dilution factors for this permit cycle. They were: retaining the existing dilution factors, calculating new dilution factors using a mass-balance algorithm, and calculating new dilution factors using the Department's standard spreadsheet, RIVPLUME5. The fact sheet associated with the previous permit did not document the methodology used to determine the dilution factors of 12.5 (acute) and 41.8 (chronic). However, since these dilution factors have undergone public review and have been effective for the past five years, they are regulatory valid dilution factors.

In accordance with WAC 173-201A-100(8)(a), dilution factors can be determined utilizing the following mass-balance algorithm:

$$(Qa + Qe)/Qe$$

where

Qa is the regulatory-defined fraction of the 7Q10 critical season flow; and,
Qe is the regulatory-defined effluent flow.

The 7Q10 flow is defined as the seven day average low river flow with a recurrence interval of ten years. The fact sheet associated with the previous permit determined the 7Q10 flow for this stretch of the river to be 262 cubic feet per second (cfs), but the source of this value was not documented. A new 7Q10 value was recently determined by the Department utilizing flow data from the US Geological Survey gage station at Nighthawk, WA. The period of record was from 1923 to 2001. The revised 7Q10 value is 186 cfs.

Two and one-half percent of the 7Q10 flow is used for determination of the acute dilution factor. Twenty-five percent of the 7Q10 flow is used for determination of the chronic dilution factor.

Table 7: Mass-Balance Dilution Factors

Parameter	Acute	Chronic
Qa (Ambient Flow)	4.65 cfs	46.5 cfs
Qe (Effluent Flow)	0.356 cfs	0.309 cfs
Mass-Balance Dilution Factors	**14.1**	**151.5**

Finally, new dilution factors were calculated using the RIVPLUME5 spreadsheet. The highest reported daily and average monthly flows were used to calculate the acute and chronic dilution

factors, respectively. Other inputs may be found in the spreadsheet in Appendix C. The resulting dilution factors were 149 (acute) and 549 (chronic).

In summary, the three methodologies yielded the following dilution factors:

Table 8: Summary of Possible Dilution Factors

Methodology	Acute	Chronic
Previous Permit	12.5	41.8
Mass Balance	14.1	151.5
RIVPLUME5	149	549

The dilution factors established in the previous permit were retained in this permit because they are the most stringent resulting from the three methodologies. Furthermore, WAC 173-201A-100(6) states that the 'size of the mixing zone shall be minimized' to the extent possible. Although the criteria used to determine these dilution factors cannot be documented, these values are the most conservative of the three methods described in the above paragraphs and do not result in a reasonable potential for pollutants in the discharge to exceed the water quality criteria.

BOD_5--Under critical conditions, and using very conservative assumptions, there was a small decrease in the river DO at the edge of the chronic dilution zone. Conservative assumptions include using the 5th percentile effluent and receiving water DO concentrations and the 95th percentile effluent and receiving water temperatures. In addition, reliable values could not be determined for two vital parameters, the reaeration and the BOD decay rates. Using these conservative assumptions the receiving water DO decreased from 9.72 mg/L to 9.06 mg/L, or a predicted decrease of 0.65 mg/L. Therefore, in consideration of the conservative assumptions used in the analysis, the lack of accurate reaeration and the BOD decay rates, and the high quality effluent consistently discharged from the facility, it is the best professional judgment of the permit writer that the technology-based effluent limitation for BOD_5 will be protective of water quality. The calculations used to determine dissolved oxygen impacts are presented in the DOSAG2.WK1 spreadsheet in Appendix C. The sources of the data used in the calculation are included in the annotated spreadsheet.

Temperature--The impact of the discharge on the temperature of the receiving water was modeled by simple mixing analysis at critical condition. The receiving water temperature at the critical condition is 16^{o}C and the effluent temperature is 22.9^{o}C. These are 95th percentile values. The point of compliance for Temperature is the edge of the chronic mixing zone; therefore, the dilution factor used in the analysis was 41.8. The predicted resultant temperature at the boundary of the chronic mixing zone is 16.17^{o}C and the incremental rise is 0.17 ^{o}C.

WAC 173-201A-030(2)(c)(iv) states: Incremental Temperature increases resulting from point sources shall not, at any time, exceed t = 28/(T+7) for fresh water. For purposes thereof, 't' represents the maximum permissible increase measured at the mixing zone boundary; and 'T' represents the background Temperature as measured at a point or points unaffected by the

discharge and representative of the highest ambient water Temperature in the vicinity of the discharge.

The Department's maintains an ambient monitoring site approximately one mile upstream of the City's outfall. Ambient Temperature data from the 2001 water year (October 2000 through September 2001) were used in the analysis. (Water year 2002 data have not been finalized yet.) Effluent Temperature data from 2002 were used in the analysis. The 95th percentile values for each data set were used. They were 16ºC (ambient) and 22.9ºC (effluent). The calculation is as follows:

$$t = 28/(T+7)$$

$$t = 28/(16+7)$$

$$t = 28/23$$

$$t = 1.22$$

The calculated incremental increase at the edge of the mixing zone is 0.17ºC, much less than 1.22ºC. Therefore, under critical conditions there is no predicted violation of the Water Quality Standards for Surface Waters and no effluent limitation for temperature was placed in this permit.

pH--During 2002 effluent pH in the discharge ranged from 7.6 to 8.1, well within the water quality criteria of 6.5 to 8.5. Under critical conditions there is no predicted violation of the Water Quality Standards for Surface Waters. Therefore, the technology-based effluent limitations for pH was placed in the permit.

Fecal coliform--During 2002 the highest reported average monthly effluent concentration was 27 colonies/100 mL and the highest single sample result was 257 colonies/100 mL. These reported concentrations comply with the water quality standards even without dilution. Under critical conditions there is no predicted violation of the Water Quality Standards for Surface Waters with the technology-based limit. Therefore, the technology-based effluent limitation for fecal coliform bacteria was placed in this permit.

Toxic Pollutants--Federal regulations (40 CFR 122.44) require NPDES permits to contain effluent limits for toxic chemicals in an effluent whenever there is a reasonable potential for those chemicals to exceed the surface water quality criteria. This process occurs concurrently with the derivation of technology-based effluent limits. Facilities with technology-based effluent limits defined in regulation are not exempted from meeting the Water Quality Standards for Surface Waters or from having surface water quality-based effluent limits.

The following toxics were determined to be present in the discharge and/or in the treatment plant's activated sludge: DDT, PCB and their metabolites, and Arsenic. The treatment plant's discharge and sludge were sampled for these pollutants as part of the TMDL efforts to address non-attainment of water quality standards. The Similkameen River is water quality-impaired for Arsenic. The Okanogan River, into which the Similkameen discharges approximately 4 miles downstream of the outfall, is water quality-impaired for DDT, PCB and their metabolites.

DDT, PCB and their metabolites are addressed together in this fact sheet and the permit because they are addressed jointly in the Department's multi-parameter TMDL Study. Arsenic is addressed separately in this fact sheet and permit because it is being addressed in its own TMDL Study.

DDT, PCB and their Metabolites

DDT and its metabolites were detected in the City's effluent in 2 of 3 samples taken in April and May of 2001 and May of 2002. Both DDT and PCB metabolites were found in the treatment plant sludge. The following effluent data were excerpted from Table 11 of the draft TMDL Report. The May 2002 sample was analyzed for PCBs only. Data are reported in nanograms per liter (ng/L).

Table 9: DDT and PCB Effluent Characterization

Date	4,4'-DDE, in ng/L	4,4'-DDD, in ng/L	4,4'-DDT, in ng/L	t-DDT, in ng/L	PCBs, in ng/L
4/17/01	0.5	u(0.9)	0.6	1.1	nd
5/16/01	u(1.7)	u(1.7)	0.7	0.7	nd
5/14/02	na	na	na	na	u(0.63)

u-undetected at practical quantitation limit in parenthesis.
nd-not detected, no practical quantitation limit determined.

The report notes that daily effluent loads of DDT and PCBs were low at all three treatment plants (Oroville, Omak and Okanogan). The Oroville facility had daily loads similar to the lowest measured loads in the tributary streams.

PCBs were found to be present in treatment plant sludges at substantial concentrations. Since PCBs were difficult to detect in water, investigators estimated daily loads of PCBs discharged from the facility based on the concentrations of suspended solids in the effluent. They assumed the suspended solids in the effluent were composed primarily of sludge (TMDL Draft Report, pp. 34-35).

Estimated DDT and PCB daily loads discharged from the Oroville treatment plant to the Similkameen River, based on effluent samples (DDT) and sludge samples (PCBs) are presented in Table 10.

Table 10: Estimated Daily Loads of DDT and PCB

4,4'-DDE, in mg/day	4,4'-DDD, in mg/day	4,4'-DDT, in mg/day	t-DDT, in mg/day	t-PCB[a], in mg/day
0.1	0.0	0.4	0.5	0.1

a-Results shown are for PCB Aroclors 1260, 1254, 1248, 1242, 1232, 1221 and 1016.

The report notes that the PCB daily load from the Oroville treatment plant represents about 0.01 percent of the assimilative capacity of the Okanogan River near Tonasket (TMDL Report, p. 36).

In the best professional judgment of the Department, establishment of effluent limits for DDT, PCB and their metabolites is not appropriate at this time, for several reasons. First, the TMDL Report is still in draft form. The issuance date for the final report has not been determined and it must be reviewed and approved by US EPA. Second, its difficult to establish effluent limits based on the two effluent samples that have been taken up until this time, because it is not known whether these sample results are representative. The Department generally considers six to eight samples to be the minimum for statistical validity. Third, DDT has been largely banned in this country since 1972 and PCB since 1979, and the Department feels it is not appropriate to establish effluent limits for these illegal substances. The Department feels the most desirable outcome for this situation is to determine how these substances are entering the collection system, and permanently eliminating them from the POTW. Therefore, this permit establishes a Schedule of Compliance to address this problem. The Schedule of Compliance is described and discussed later in its own section of this fact sheet .

Arsenic

As part of the TMDL Study for Arsenic in the Similkameen River, the City's water supply and treatment plant effluent were tested for this pollutant. Arsenic is a naturally-occurring element commonly present in the geology of Okanogan County. Arsenic was found to be present in both the water supply and effluent at a concentration of approximately 3 µg/L. These results indicate that dischargers to the City's treatment plant are not contributing to the already existing presence of this pollutant.

The following narrative is excerpted from a memo dated May 8, 2003 from Ecology's Environmental Assessment Program to the Department's Central Regional Office. The memo describes the decision process for determining the waste load allocation, which is the basis for the Arsenic effluent limit established in this permit.

> Monitoring results revealed Arsenic concentrations of 2.8 and 2.9 µg/L in the effluent samples. These results are consistent with drinking water sampling conducted for the Washington Department of Health that showed concentrations of 3.0 and 3.5 µg/L total Arsenic.

The design criterion monthly average flow (maximum month) for the Oroville treatment plant is 0.50 MGD. An Arsenic concentration of 2.85 µg/L in a 0.50 MGD discharge would constitute a load of 5.3 g/day, or 0.012 lbs/day.

The revised standard for Arsenic in drinking water under the Federal Safe Drinking Water Act is 10 µg/L. It has been agreed to that the waste load allocation for the City's wastewater treatment plant be set at the allowable drinking water standard and the hydraulic design capacity of the facility. This results in an Arsenic waste load allocation of 19 g/day.

Holding the facility to results from the two measurements made last year relies too heavily on the assumption that these are representative values and could be unfairly restrictive to the City when expansion of the system is needed or if changes are needed to the municipal water/wastewater system. This could raise the cost of water supply or treatment substantially depending on where the City chooses to treat the Arsenic in the system.

At a loading rate of 19 g/day, the City's treatment plant would have an essentially undetectable effect on the Arsenic concentration in the Similkameen River. At the 7Q10 of 186 cubic feet per second (cfs), and assuming an upstream Arsenic concentration of 0.40 µg/L (from the above report), an Arsenic concentration of 10 µg/L in the final effluent would result in a downstream concentration of 0.44 µg/L after mixing.

Based on the narrative in the previous paragraphs, the daily maximum effluent limit for Arsenic established in this permit is 19 g/day.

Whole Effluent Toxicity

The Water Quality Standards for Surface Waters require that the effluent not cause toxic effects in the receiving waters. Many toxic pollutants cannot be detected by commonly available detection methods. However, toxicity can be measured directly by exposing living organisms to the wastewater in laboratory tests and measuring the response of the organisms. Toxicity tests measure the aggregate toxicity of the whole effluent, and therefore this approach is called whole effluent toxicity (WET) testing. Some WET tests measure acute toxicity and other WET tests measure chronic toxicity.

In accordance with WAC 173-205-040, the Permittee's effluent has been determined to contain Arsenic, and DDT, PCB and their metabolites. This permit would ordinarily contain requirements for whole effluent toxicity testing as authorized by RCW 90.48.520 and 40 CFR 122.44 and in accordance with procedures in Chapter 173-205 WAC. However, the Permittee is improving pollution control in order to meet other regulatory requirements. Specifically, the City will be conducting a study to determine the source of DDT and PCB in its effluent, and

reduce or eliminate these toxics from the POTW. The results of an effluent characterization for toxicity would not be accurate until after the improvements have been completed.

WAC 173-205-030(4) allows the Department to delay effluent characterization for WET for existing facilities that are under a compliance schedule in a permit to implement technology-based controls or to achieve compliance with surface water quality-based effluent limits. The need for WET Testing will be reevaluated at the next permit renewal.

Human Health

Washington's water quality standards now include 91 numeric health-based criteria that must be considered in NPDES permits. These criteria were promulgated for the State by the U.S. EPA in its National Toxics Rule (Federal Register, Volume 57, No. 246, Tuesday, December 22, 1992).

The Department has determined that the effluent has chemicals of concern for human health. The chemicals of concern are Arsenic, and DDT, PCB and their metabolites. This determination is based on the results of sampling undertaken as part of the Arsenic TMDL Study and the DDT and PCB TMDL Study.

The inorganic species of Arsenic and all the variants of DDT and PCB have numerical human health criteria. They are as follows:

Table 11: Applicable Human Health Criteria

Parameter	Criterion
Arsenic, Inorganic	0.018 µg/L
DDT	0.00059 µg/L
DDE	0.00059 µg/L
DDD	0.00083 µg/L
PCBs, Total	0.00017 µg/L

Concerning Arsenic, the State's antidegradation policy states: Whenever the natural conditions of said waters are of lower quality than the criteria assigned, the natural criteria shall constitute the water quality criteria (WAC 173-210A-070(2)). During the Department's ambient monitoring program conducted from May 2000 through June 2001, total recoverable Arsenic concentrations ranged from 1.4 to 4.6 µg/L.

The TMDL Report proposed numerical targets, to be viewed as 'water quality goals', rather than 'not to exceed' values for the Similkameen River. The numerical targets are based on monthly averages of Arsenic observed in the river at Princeton, British Columbia, at River Mile 98.3. This reference point was chosen because no large anthropogenic sources of Arsenic are known to occur in the watershed upstream of this point. If approved by US EPA, the proposed numerical targets will comprise the human health criteria and are as follows:

Table12: Proposed Numerical Targets

Month	Target Concentration
May & June	0.6 µg/L
April & July	0.5 µg/L
August - March	0.4 µg/L

The report goes on to state that these proposed targets make no allowance for the downstream increase in Arsenic concentrations that might occur naturally as the Similkameen flows between Princeton and the US border, even if anthropogenic sources were removed. If new data or analysis can provide a reliable estimate of what that increase would be, the numerical targets should be revised upward accordingly. In the interim, the proposed targets appear reasonable, given the concentrations typical of other Washington rivers and streams. (TMDL Report, pp. 35-39)

Regarding DDT, PCB and their metabolites, the TMDL Study has not progressed as far as the Arsenic Study; therefore, the discussion of what numerical criteria (or targets) to use has not reached the same level of resolution. Application of DDT and PCB water quality criteria to the City's discharge will be addressed in the next permit, if necessary.

Sediment Quality

The Department has promulgated aquatic sediment standards (Chapter 173-204 WAC) to protect aquatic biota and human health. These standards state that the Department may require Permittees to evaluate the potential for the discharge to cause a violation of applicable standards (WAC 173-204-400).

The Department has determined through a review of the discharger characteristics and effluent characteristics that this discharge has no reasonable potential to violate the Sediment Management Standards. This determination is based on historical discharge records that indicate the low concentrations of suspended solids in the discharge and the relatively large amount of dilution in the river. The potential to exceed the sediment standards will be reevaluated at the next permit renewal.

SCHEDULE OF COMPLIANCE

As has been stated earlier in this fact sheet, low concentrations of DDT, PCB and their metabolites have been found in the treatment plant sludge and effluent as a result of sampling undertaken as part of the TMDL Study. The Department has determined that it would be inappropriate at this time to establish numerical effluent limits for these pollutants. See the section of this fact sheet **Consideration of Surface Water Quality-Based Limits for Numeric Criteria,** *DDT, PCB and their Metabolites* for the discussion of this determination.

The Schedule of Compliance requires the completion of a study to determine the source of DDT, PCB and their metabolites that have been found in the treatment plant's effluent. The goals of the study are to identify the source of the pollutants, their entry point into the POTW, and to develop measures to eliminate these substances from the POTW.

The Schedule of Compliance is intended to be fulfilled by the end of this permit cycle. The City is required to submit a Scope of Work, which describes the strategy and methodology of the study, followed by twice-per-year progress reports. The final report of the study is due with the next application for permit renewal.

GROUND WATER QUALITY LIMITATIONS

The Department has promulgated Ground Water Quality Standards (Chapter 173-200 WAC) to protect uses of ground water. Permits issued by the Department shall be conditioned in such a manner so as not to allow violations of those standards (WAC 173-200-100).

This Permittee has no discharge to ground; therefore, no limitations are required based on potential effects to ground water.

COMPARISON OF EFFLUENT LIMITS WITH THE PREVIOUS PERMIT

Table 13: Comparison of Existing and Proposed Effluent Limits

Parameter	**Existing Permit Limits**		**Proposed Permit Limits**	
	Monthly Average	**Weekly Average**	**Monthly Average**	**Weekly Average**
BOD	30 mg/L 368 lbs/day 85 % removal	45 mg/L 552 lbs/day	30 mg/L 368 lbs/day 85 % removal	45 mg/L 552 lbs/day
TSS	30 mg/L 368 lbs/day 85 % removal	45 mg/L 552 lbs/day	30 mg/L 368 lbs/day 85 % removal	45 mg/L 552 lbs/day
Fecal Coliform	200/100 mL	400/100 mL	200/100 mL	400/100 mL
pH	6 to 9 standard units		6 to 9 standard units	
Parameter	**Monthly Average**	**Daily Maximum**	**Monthly Average**	**Daily Maximum**
Total Arsenic	No Limit	No Limit	Not Applicable	19.0 g/day

Effluent limits for the conventional pollutants remain unchanged from the previous permit. The Arsenic mass loading limit was a result of the TMDL process and is based on the Safe Drinking Water Act standard of 10 µg/L and the treatment plant's hydraulic design capacity of 0.5 MGD.

MONITORING REQUIREMENTS

Monitoring, recording, and reporting are required (WAC 173-220-210 and 40 CFR 122.41) to verify that the treatment process is functioning correctly and the effluent limitations are being achieved.

The monitoring schedule is detailed in this permit under Special Condition S2. Specified monitoring frequencies take into account the quantity and variability of discharge, the treatment method, past compliance, significance of pollutants, and cost of monitoring. The required monitoring frequency is consistent with agency guidance given in the current version of Ecology's *Permit Writer's Manual* (July 1994) for oxidation ditches, except that the BOD and TSS monitoring frequency is once per week rather than twice per week. This reduced monitoring frequency is in recognition of the very low concentrations of BOD and TSS in the discharge, usually one-third of the effluent limit, and the consistency of these low concentrations.

The monitoring schedule is largely unchanged from the previous permit, with a few minor revisions. Testing for Residual Chlorine has been dropped because this chemical has not been utilized at the facility since the UV disinfection system was installed. Testing for Alkalinity and Hardness has been eliminated from this permit because the Department has five years of data for these parameters and the data are very consistent.

Analysis for Total Arsenic has been added to the monitoring program to verify compliance with the new effluent limit for this pollutant. In the best professional judgment of the Department, quarterly monitoring of this pollutant is sufficient to assure compliance with the Arsenic effluent limit. The Permittee is required to conduct sampling for Arsenic utilizing clean sampling techniques (*Method 1669: Sampling Ambient Water for Trace Metals at EPA Water Quality Criteria Levels*, EPA Publication No. 821-R-95-034, April 1995). After the analytical results of eight samples have been analyzed for Total Arsenic, the City may request a reduction in monitoring frequency for this parameter, in accordance with Special Condition S2.E of this permit. If the Department approves the request, the monitoring frequency will likely be reduced to no less than twice per year.

This permit requires the City to undertake a study to identify the sources of DDT and PCB, and eliminate DDT and PCB from the POTW. This permit does not specify a monitoring program for this effort. Rather, the City is required to propose a monitoring program as part of the study's scope of work, to be submitted early in the permit cycle.

LAB ACCREDITATION

With the exception of certain parameters the permit requires all monitoring data to be prepared by a laboratory registered or accredited under the provisions of Chapter 173-50 WAC,

Accreditation of Environmental Laboratories. The laboratory at this facility is accredited for BOD, Total Residual Chlorine, Dissolved Oxygen, pH, TSS and Fecal Coliform Bacteria.

OTHER PERMIT CONDITIONS

REPORTING AND RECORDKEEPING

The provisions of Special Condition S3. are based on the authority to specify any appropriate reporting and recordkeeping requirements to prevent and control waste discharges (WAC 173-220-210).

PREVENTION OF FACILITY OVERLOADING

Overloading of the treatment plant is a violation of the terms and conditions of the permit. To prevent this from occurring, RCW 90.48.110 and WAC 173-220-150 require the Permittee to take the actions detailed in Special Condition S4. to plan expansions or modifications before existing capacity is reached and to report and correct conditions that could result in new or increased discharges of pollutants. Special Condition S4. restricts the amount of flow.

OPERATION AND MAINTENANCE (O&M)

This permit contains Special Condition S5. as authorized under RCW 90.48.110, WAC 173-220-150, Chapter 173-230 WAC, and WAC 173-240-080. It is included to ensure proper operation and regular maintenance of equipment, and to ensure that adequate safeguards are taken so that constructed facilities are used to their optimum potential in terms of pollutant capture and treatment.

The previous permit required the City to submit an updated O&M Manual to the Department for review and approval. Upon review the manual was found to be deficient. This permit requires the City to submit an approvable manual by October 15, 2003. With the application for permit renewal, the permit requires the City to submit either (1) an updated manual or (2) a letter certifying that the no operational changes have occurred at the treatment plant and the existing manual is sufficient.

RESIDUAL SOLIDS HANDLING

To prevent water quality problems the Permittee is required in Special Condition S7. to store and handle all residual solids (grit, screenings, scum, sludge, and other solid waste) in accordance with the requirements of RCW 90.48.080 and State Water Quality Standards.

The final use and disposal of sewage sludge from this facility is regulated by U.S. EPA under 40 CFR 503, and by Ecology under Chapter 70.95J RCW and Chapter 173-308 WAC. The disposal of other solid waste is under the jurisdiction of the Okanogan County Health Department.

PRETREATMENT

Federal and State Pretreatment Program Requirements

Under the terms of the addendum to the "Memorandum of Understanding between Washington Department of Ecology and the United States Environmental Protection Agency, Region 10" (1986), the Department of Ecology (Department) has been delegated authority to administer the Pretreatment Program (i.e. act as the Approval Authority for oversight of delegated Publicly Owned Treatment Works (POTWs)). Under this delegation of authority, the Department has exercised the option of issuing wastewater discharge permits for significant industrial users discharging to POTWs which have not been delegated authority to issue wastewater discharge permits.

There are a number of functions required by the Pretreatment Program which the Department delegates to such POTWs because they are in a better position to implement the requirements (e.g. tracking the number and general nature of industrial dischargers to the sewerage system). The requirements for a Pretreatment Program are contained in Title 40, part 403 of the Code of Federal Regulations. Under the requirements of the Pretreatment Program (40 CFR 403.8(f)(1)(iii)), the Department is required to approve, condition, or deny new discharges or a significant increase in the discharge for existing significant industrial users (SIUs) (40 CFR 403.8 (f)(1)(i)).

The Department is responsible for issuing State Waste Discharge Permits to SIUs and certain other industrial users of the Permittee's sewer system. Industrial dischargers must obtain these permits from the Department prior to the Permittee accepting the discharge (WAC 173-216-110(5)). (Industries discharging wastewater that is similar in character to domestic wastewater are not required to obtain a permit. Such dischargers should contact the Department to determine if a permit is required.). Industrial dischargers need to apply for a State Waste Discharge Permit at least sixty days prior to commencing discharge. The conditions contained in the permits include any applicable conditions for categorical discharges, loading limitations included in contracts with the POTW, and other conditions necessary to assure compliance with State water quality standards and biosolids standards.

Wastewater Permit Required

RCW 90.48 and WAC 173-216-040 require SIUs to obtain a permit prior to discharge of industrial waste to the Permittee's sewerage system. This provision prohibits the POTW from accepting industrial wastewater from any such dischargers without authorization from the Department.

Requirements for Routine Identification and Reporting of Industrial Users

The NPDES permit requires non-delegated POTWs to "take continuous, routine measures to identify all existing, new, and proposed SIUs and potential significant industrial users (PSIUs) discharging to the Permittee's sewerage system". Examples of such routine measures include regular review of business tax licenses for existing businesses and review of water billing records and existing connection authorization records. System maintenance personnel can also be diligent during performance of their jobs in identifying and reporting as-yet unidentified industrial dischargers. Local newspapers, telephone directories, and word-of-mouth can also be important sources of information regarding new or existing discharges. The POTW is required to notify an industrial discharger, in writing, of their responsibilities regarding application for a State waste discharge permit and to send a copy of the written notification to the Department. The Department will then take steps to solicit a State Waste Discharge Permit application.

Duty to Enforce Discharge Prohibitions

This provision prohibits the POTW from authorizing or permitting an industrial discharger to discharge certain types of waste into the sanitary sewer. The first portion of the provision prohibits acceptance of pollutants which cause pass through or interference. The definitions of pass through and interference are in Appendix B of the fact sheet..

The second portion of this provision prohibits the POTW from accepting certain specific types of wastes, namely those which are explosive, flammable, excessively acidic, basic, otherwise corrosive, or obstructive to the system. In addition, wastes with excessive BOD, petroleum based oils, or which result in toxic gases are prohibited to be discharged. The regulatory basis for these prohibitions is 40 CFR Part 403, with the exception of the pH provisions which are based on WAC 173-216-060.

The third portion of this provision prohibits certain types of discharges unless the POTW receives prior authorization from the Department. The discharges include cooling water in significant volumes, stormwater and other direct inflow sources, and wastewaters significantly affecting system hydraulic loading, which do not require treatment.

Support by the Department for Developing Partial Pretreatment Program by POTW

The Department has committed to providing technical and legal assistance to the Permittee in fulfilling these joint obligations, in particular assistance with developing an adequate sewer use ordinance, notification procedures, enforcement guidelines, and developing local limits and inspection procedures.

GENERAL CONDITIONS

General Conditions are based directly on State and Federal law and regulations and have been standardized for all individual municipal NPDES permits issued by the Department.

PERMIT ISSUANCE PROCEDURES

PERMIT MODIFICATIONS

The Department may modify this permit to impose numerical limitations, if necessary to meet Water Quality Standards, Sediment Quality Standards, or Ground Water Standards, based on new information obtained from sources such as inspections, effluent monitoring, outfall studies, and effluent mixing studies.

The Department may also modify this permit as a result of new or amended State or Federal regulations.

RECOMMENDATION FOR PERMIT ISSUANCE

This proposed permit meets all statutory requirements for authorizing a wastewater discharge, including those limitations and conditions believed necessary to protect human health, aquatic life, and the beneficial uses of waters of the State of Washington. The Department proposes that this permit be issued for five (5) years.

REFERENCES FOR TEXT AND APPENDICES

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1985. Water Quality Assessment: A Screening Procedure for Toxic and Conventional Pollutants in Surface and Ground Water. EPA/600/6-85/002a.

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2002. A Total Maximum Daily Load Evaluation for Arsenic in the Similkameen River. Publication Number 02-03-044.

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Wright, R.M., and A.J. McDonnell.

1979. In-stream Deoxygenation Rate Prediction. Journal Environmental Engineering Division, ASCE. 105(EE2). (Cited in EPA 1985 op.cit.)

APPENDIX A -- PUBLIC INVOLVEMENT INFORMATION

The Department has tentatively determined to reissue a permit to the applicant listed on page 1 of this fact sheet. The permit contains conditions and effluent limitations which are described in the rest of this fact sheet.

Public notice of application was published on July 16, 2003 in the Wenatchee World to inform the public that an application had been submitted and to invite comment on the reissuance of this permit.

The Department will publish a Public Notice of Draft (PNOD) on August 7, 2003 in the Oroville Gazette Publishing, LTD to inform the public that a draft permit and fact sheet are available for review. Interested persons are invited to submit written comments regarding the draft permit. The draft permit, fact sheet, and related documents are available for inspection and copying between the hours of 8:00 a.m. and 5:00 p.m. weekdays, by appointment, at the regional office listed below. Written comments should be mailed to Water Quality Permit Coordinator, Department of Ecology, Central Regional Office, 15 West Yakima Avenue, Suite 200, Yakima, Washington 98902.

Any interested party may comment on the draft permit or request a public hearing on this draft permit within the thirty (30) day comment period to the address above. The request for a hearing shall indicate the interest of the party and the reasons why the hearing is warranted. The Department will hold a hearing if it determines there is a significant public interest in the draft permit (WAC 173-220-090). Public notice regarding any hearing will be circulated at least thirty (30) days in advance of the hearing. People expressing an interest in this permit will be mailed an individual notice of hearing (WAC 173-220-100).

Comments should reference specific text followed by proposed modification or concern when possible. Comments may address technical issues, accuracy and completeness of information, the scope of the facility's proposed coverage, adequacy of environmental protection, permit conditions, or any other concern that would result from issuance of this permit.

The Department will consider all comments received within thirty (30) days from the date of public notice of draft indicated above, in formulating a final determination to issue, revise, or deny the permit. The Department's response to all significant comments is available upon request and will be mailed directly to people expressing an interest in this permit.

Further information may be obtained from the Department by telephone, 509/457-7105, or by writing to the address listed above.

This fact sheet and the proposed permit were written by Jim LaSpina.

APPENDIX B -- GLOSSARY

Acute Toxicity--The lethal effect of a pollutant on an organism that occurs within a short period of time, usually 48 to 96 hours.

AKART-- An acronym for "all known, available, and reasonable methods of prevention, control, and treatment".

Ambient Water Quality--The existing environmental condition of the water in a receiving water body.

Ammonia--Ammonia is produced by the breakdown of nitrogenous materials in wastewater. Ammonia is toxic to aquatic organisms, exerts an oxygen demand, and contributes to eutrophication. It also increases the amount of chlorine needed to disinfect wastewater.

Average Monthly Discharge Limitation --The highest allowable average of daily discharges over a calendar month, calculated as the sum of all daily discharges measured during a calendar month divided by the number of daily discharges measured during that month (except in the case of fecal coliform). The daily discharge is calculated as the average measurement of the pollutant over the day.

Average Weekly Discharge Limitation -- The highest allowable average of daily discharges over a calendar week, calculated as the sum of all daily discharges measured during a calendar week divided by the number of daily discharges measured during that week. The daily discharge is calculated as the average measurement of the pollutant over the day.

Best Management Practices (BMPs)--Schedules of activities, prohibitions of practices, maintenance procedures, and other physical, structural and/or managerial practices to prevent or reduce the pollution of waters of the State. BMPs include treatment systems, operating procedures, and practices to control: plant site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage. BMPs may be further categorized as operational, source control, erosion and sediment control, and treatment BMPs.

BOD_5--Determining the Biochemical Oxygen Demand of an effluent is an indirect way of measuring the quantity of organic material present in an effluent that is utilized by bacteria. The BOD_5 is used in modeling to measure the reduction of dissolved oxygen in a receiving water after effluent is discharged. Stress caused by reduced dissolved oxygen levels makes organisms less competitive and less able to sustain their species in the aquatic environment. Although BOD is not a specific compound, it is defined as a conventional pollutant under the Federal Clean Water Act.

Bypass--The intentional diversion of waste streams from any portion of a treatment facility.

CBOD5 – The quantity of oxygen utilized by a mixed population of microorganisms acting on the nutrients in the sample in an aerobic oxidation for five days at a controlled temperature of 20 degrees Celsius, with an inhibitory agent added to prevent the oxidation of nitrogen compounds. The method for determining CBOD5 is given in 40 CFR Part 136.

Chlorine--Chlorine is used to disinfect wastewaters of pathogens harmful to human health. It is also extremely toxic to aquatic life.

Chronic Toxicity--The effect of a pollutant on an organism over a relatively long time, often 1/10 of an organism's lifespan or more. Chronic toxicity can measure survival, reproduction or growth rates, or other parameters to measure the toxic effects of a compound or combination of compounds.

Clean Water Act (CWA)--The Federal Water Pollution Control Act enacted by Public Law 92-500, as amended by Public Laws 95-217, 95-576, 96-483, 97-117; USC 1251 et seq.

Combined Sewer Overflow (CSO)--The event during which excess combined sewage flow caused by inflow is discharged from a combined sewer, rather than conveyed to the sewage treatment plant because either the capacity of the treatment plant or the combined sewer is exceeded.

Compliance Inspection - Without Sampling--A site visit for the purpose of determining the compliance of a facility with the terms and conditions of its permit or with applicable statutes and regulations.

Compliance Inspection - With Sampling--A site visit to accomplish the purpose of a Compliance Inspection - Without Sampling and as a minimum, sampling and analysis for all parameters with limits in the permit to ascertain compliance with those limits; and, for municipal facilities, sampling of influent to ascertain compliance with the percent removal requirement. Additional sampling may be conducted.

Composite Sample--A mixture of grab samples collected at the same sampling point at different times, formed either by continuous sampling or by mixing a minimum of four discrete samples. May be "time-composite"(collected at constant time intervals) or "flow-proportional" (collected either as a constant sample volume at time intervals proportional to stream flow, or collected by increasing the volume of each aliquot as the flow increased while maintaining a constant time interval between the aliquots.

Construction Activity--Clearing, grading, excavation and any other activity which disturbs the surface of the land. Such activities may include road building, construction of residential houses, office buildings, or industrial buildings, and demolition activity.

Continuous Monitoring –Uninterrupted, unless otherwise noted in the permit.

Critical Condition--The time during which the combination of receiving water and waste discharge conditions have the highest potential for causing toxicity in the receiving water environment. This situation usually occurs when the flow within a water body is low, thus, its ability to dilute effluent is reduced.

Dilution Factor--A measure of the amount of mixing of effluent and receiving water that occurs at the boundary of the mixing zone. Expressed as the inverse of the effluent fraction e.g., a dilution factor of 10 means the effluent comprises 10% by volume and the receiving water 90%.

Engineering Report--A document which thoroughly examines the engineering and administrative aspects of a particular domestic or industrial wastewater facility. The report shall contain the appropriate information required in WAC 173-240-060 or 173-240-130.

Fecal Coliform Bacteria--Fecal coliform bacteria are used as indicators of pathogenic bacteria in the effluent that are harmful to humans. Pathogenic bacteria in wastewater discharges are controlled by disinfecting the wastewater. The presence of high numbers of fecal coliform bacteria in a water body can indicate the recent release of untreated wastewater and/or the presence of animal feces.

Grab Sample--A single sample or measurement taken at a specific time or over as short period of time as is feasible.

Industrial User-- A discharger of wastewater to the sanitary sewer which is not sanitary wastewater or is not equivalent to sanitary wastewater in character.

Industrial Wastewater--Water or liquid-carried waste from industrial or commercial processes, as distinct from domestic wastewater. These wastes may result from any process or activity of industry, manufacture, trade or business, from the development of any natural resource, or from animal operations such as feed lots, poultry houses, or dairies. The term includes contaminated storm water and, also, leachate from solid waste facilities.

Infiltration and Inflow (I/I)--"Infiltration" means the addition of ground water into a sewer through joints, the sewer pipe material, cracks, and other defects. "Inflow" means the addition of precipitation-caused drainage from roof drains, yard drains, basement drains, street catch basins, etc., into a sewer.

Interference -- A discharge which, alone or in conjunction with a discharge or discharges from other sources, both:

Inhibits or disrupts the POTW, its treatment processes or operations, or its sludge processes, use or disposal and;

Therefore is a cause of a violation of any requirement of the POTW's NPDES permit (including an increase in the magnitude or duration of a violation) or of the prevention of sewage sludge use or disposal in compliance with the following statutory provisions and regulations or permits issued thereunder (or more stringent State or local regulations): Section 405 of the Clean Water Act, the Solid Waste Disposal Act (SWDA) (including title II, more commonly referred to as the Resource Conservation and Recovery Act (RCRA), and including State regulations contained in any State sludge management plan prepared pursuant to subtitle D of the SWDA), sludge regulations appearing in 40 CFR Part 507, the Clean Air Act, the Toxic Substances Control Act, and the Marine Protection, Research and Sanctuaries Act.

Major Facility--A facility discharging to surface water with an EPA rating score of > 80 points based on such factors as flow volume, toxic pollutant potential, and public health impact.

Maximum Daily Discharge Limitation--The highest allowable daily discharge of a pollutant measured during a calendar day or any 24-hour period that reasonably represents the calendar day for purposes of sampling. The daily discharge is calculated as the average measurement of the pollutant over the day.

Method Detection Level (MDL)--The minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is above zero and is determined from analysis of a sample in a given matrix containing the analyte.

Minor Facility--A facility discharging to surface water with an EPA rating score of < 80 points based on such factors as flow volume, toxic pollutant potential, and public health impact.

Mixing Zone--A volume that surrounds an effluent discharge within which water quality criteria may be exceeded. The area of the authorized mixing zone is specified in a facility's permit and follows procedures outlined in State regulations (Chapter 173-201A WAC).

National Pollutant Discharge Elimination System (NPDES)--The NPDES (Section 402 of the Clean Water Act) is the Federal wastewater permitting system for discharges to navigable waters of the United States. Many states, including the State of Washington, have been delegated the authority to issue these permits. NPDES permits issued by Washington State permit writers are joint NPDES/State permits issued under both State and Federal laws.

Pass through -- A discharge which exits the POTW into waters of the-State in quantities or concentrations which, alone or in conjunction with a discharge or discharges from other sources, is a cause of a violation of any requirement of the POTW's NPDES permit (including an increase in the magnitude or duration of a violation), or which is a cause of a violation of State water quality standards.

pH--The pH of a liquid measures its acidity or alkalinity. A pH of 7 is defined as neutral, and large variations above or below this value are considered harmful to most aquatic life.

Potential Significant Industrial User--A potential significant industrial user is defined as an Industrial User which does not meet the criteria for a Significant Industrial User, but which discharges wastewater meeting one or more of the following criteria:

a. Exceeds 0.5 % of treatment plant design capacity criteria and discharges <25,000 gallons per day or;

b. Is a member of a group of similar industrial users which, taken together, have the potential to cause pass through or interference at the POTW (e.g. facilities which develop photographic film or paper, and car washes).

The Department may determine that a discharger initially classified as a potential significant industrial user should be managed as a significant industrial user.

Quantitation Level (QL)-- A calculated value five times the MDL (method detection level).

Significant Industrial User (SIU)--

1) All industrial users subject to Categorical Pretreatment Standards under 40 CFR 403.6 and 40 CFR Chapter I, Subchapter N and;
2) Any other industrial user that: discharges an average of 25,000 gallons per day or more of process wastewater to the POTW (excluding sanitary, noncontact cooling, and boiler blow-down wastewater); contributes a process wastestream that makes up 5 percent or more of the average dry weather hydraulic or organic capacity of the POTW treatment plant; or is designated as such by the Control Authority* on the basis that the industrial user has a reasonable potential for adversely affecting the POTW's operation or for violating any pretreatment standard or requirement (in accordance with 40 CFR 403.8(f)(6)).

Upon finding that the industrial user meeting the criteria in paragraph 2, above, has no reasonable potential for adversely affecting the POTW's operation or for violating any pretreatment standard or requirement, the Control Authority* may at any time, on its own initiative or in response to a petition received from an industrial user or POTW, and in accordance with 40 CFR 403.8(f)(6), determine that such industrial user is not a significant industrial user.

*The term "Control Authority" refers to the Washington State Department of Ecology in the case of non-delegated POTWs or to the POTW in the case of delegated POTWs.

State Waters--Lakes, rivers, ponds, streams, inland waters, underground waters, salt waters, wetlands, and all other surface waters and watercourses within the jurisdiction of the State of Washington.

Stormwater--That portion of precipitation that does not naturally percolate into the ground or evaporate, but flows via overland flow, interflow, pipes, and other features of a storm water drainage system into a defined surface water body, or a constructed infiltration facility.

Technology-based Effluent Limit--A permit limit that is based on the ability of a treatment method to reduce the pollutant.

Total Suspended Solids (TSS)--Total suspended solids are the particulate materials in an effluent. Large quantities of TSS discharged to a receiving water may result in solids accumulation. Apart from any toxic effects attributable to substances leached out by water, suspended solids may kill fish, shellfish, and other aquatic organisms by causing abrasive injuries and by clogging the gills and respiratory passages of various aquatic fauna. Indirectly, suspended solids can screen out light and can promote and maintain the development of noxious conditions through oxygen depletion.

Upset--An exceptional incident in which there is unintentional and temporary noncompliance with technology-based permit effluent limitations because of factors beyond the reasonable control of the Permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, lack of preventative maintenance, or careless or improper operation.

Water Quality-based Effluent Limit--A limit on the concentration or mass of an effluent parameter that is intended to prevent the concentration of that parameter from exceeding its water quality criterion after it is discharged into a receiving water.

APPENDIX C -- TECHNICAL CALCULATIONS

Spread of a plume from a point source in a river with boundary effects from the shoreline based on the method of Fischer *et al.* (1979) with correction for the effective origin of effluent.

Revised 22-Feb-96

OROVILLE STP DILUTION FACTORS

INPUT		
1. Effluent Discharge Rate (cfs): Avg Monthly Flow and Max Daily Flow	0.36	0.31
2. Receiving Water Characteristics		
Stream Depth (ft): From Previous Fact Sheet	2.00	2.00
Stream Velocity (fps): From Previous Fact Sheet	1.06	1.06
Channel Width (ft): Estimate	250.00	250.00
Stream Slope (ft/ft) or Manning roughness "n": Guesstimate	0.035	0.035
0 if slope or 1 if Manning "n" in previous cell:	0	0
3. Discharge Distance From Nearest Shoreline (ft): Distance of Diffuser from Streambank	125	125
4. Location of Point of Interest to Estimate Dilution		
Distance Downstream to Point of Interest (ft):	30	302
Distance From Nearest Shoreline (ft):	125	125
5. Transverse Mixing Coefficient Constant (usually 0.6):	0.6	0.6
6. Original Fischer Method (enter 0) or *Effective Origin* Modification (enter 1)	0	0
OUTPUT		
1. Source Conservative Mass Input Rate		
Concentration of Conservative Substance (%):	100.00	100.00
Source Conservative Mass Input Rate (cfs*%):	36.00	31.00
2. Shear Velocity		
Shear Velocity based on slope (ft/sec):	1.501	1.501
Shear Velocity based on Manning "n":		
using Prasuhn equations 8-26 and 8-54 assuming		
hydraulic radius equals depth for wide channel		
Darcy-Weisbach friction factor "f":	#N/A	#N/A
Shear Velocity from Darcy-Weisbach "f" (ft/sec):	#N/A	#N/A
Selected Shear Velocity for next step (ft/sec):	1.501	1.501
3. Transverse Mixing Coefficient (ft2/sec):	1.802	1.802
4. Plume Characteristics Accounting for Shoreline Effect (Fischer *et al.* , 1979)		
Co	6.79E-02	5.85E-02
x'	8.16E-04	8.21E-03
y'o	5.00E-01	5.00E-01
y' at point of interest	5.00E-01	5.00E-01
Solution using superposition equation (Fischer eqn 5.9)		
Term for n= -2	0.00E+00	2.97E-212
Term for n= -1	0.00E+00	1.31E-53
Term for n= 0	1.00E+00	1.00E+00
Term for n= 1	8.21E-134	6.02E-14
Term for n= 2	0.00E+00	1.04E-119
Upstream Distance from Outfall to *Effective Origin* of Effluent Source (ft)	#N/A	#N/A
Effective Distance Downstream from Effluent to Point of Interest (ft)	30.00	302.00
x' Adjusted for *Effective Origin*	8.16E-04	8.21E-03
C/Co (dimensionless)	9.88E+00	3.11E+00
Concentration at Point of Interest (Fischer Eqn 5.9)	6.71E-01	1.82E-01
Unbounded Plume Width at Point of Interest (ft)	40.394	128.161
Unbounded Plume half-width (ft)	20.197	64.080
Distance from near shore to discharge point (ft)	125.00	125.00
Distance from far shore to discharge point (ft)	125.00	125.00
Plume width bounded by shoreline (ft)	40.39	128.16
Approximate Downstream Distance to Complete Mix (ft):	3,677	3,677
Theoretical Dilution Factor at Complete Mix:	1,472.222	1,709.677
Calculated Flux-Average Dilution Factor Across Entire Plume Width:	237.873	876.453
Calculated Dilution Factor at Point of Interest:	149.065	549.236

Streeter-Phelps analysis of critical dissolved oxygen sag.
Based on Lotus File DOSAG2.WK1 Revised 19-Oct-93

OROVILLE STP

INPUT

ALL EFFLUENT AND RECEIVING WATER VALUES BASED ON 2002 DATA

1. EFFLUENT CHARACTERISTICS	
Discharge (cfs): Highest Avg Monthly Flow	0.309
CBOD5 (mg/L): 95th %ile	6.8
NBOD (mg/L): Reflects Ultra-Low Ammonia in Effluent	0
Dissolved Oxygen (mg/L): 5th %ile of Lowest Reported DOs	3.4
Temperature (deg C): 95th %ile	22.9
2. RECEIVING WATER CHARACTERISTICS	
Upstream Discharge (cfs): 7Q10	262
Upstream CBOD5 (mg/L): Guesstimate	1.5
Upstream NBOD (mg/L): Guesstimate	0.2
Upstream Dissolved Oxygen (mg/L): 5th %ile	9.72
Upstream Temperature (deg C): 95th %ile	16
Elevation (ft NGVD): From Monitoring Station Description	960
Downstream Average Channel Slope (ft/ft): Default	0.00088
Downstream Average Channel Depth (ft): Diffuser Depth	2
Downstream Average Channel Velocity (fps): From Previous Fact Sheet	1.06
3. REAERATION RATE (Base e) AT 20 deg C (day^-1):	6.23

Reference	Applic. Vel (fps)	Applic. Dep (ft)	Suggested Values
Churchill	1.5 - 6	2 - 50	3.85
O'Connor and Dobbins	.1 - 1.5	2 - 50	4.72
Owens	.1 - 6	1 - 2	6.23
Tsivoglou-Wallace	.1 - 6	.1 - 2	3.87

4. BOD DECAY RATE (Base e) AT 20 deg C (day^-1): 2.51

Reference	Suggested Value
Wright and McDonnell, 1979	0.67

OUTPUT

1. INITIAL MIXED RIVER CONDITION	
CBOD5 (mg/L):	1.5
NBOD (mg/L):	0.2
Dissolved Oxygen (mg/L):	9.7
Temperature (deg C):	16.0
2. TEMPERATURE ADJUSTED RATE CONSTANTS (Base e)	
Reaeration (day^-1):	5.67
BOD Decay (day^-1):	2.09
3. CALCULATED INITIAL ULTIMATE CBODU AND TOTAL BODU	
Initial Mixed CBODU (mg/L):	2.2
Initial Mixed Total BODU (CBODU + NBOD, mg/L):	2.4
4. INITIAL DISSOLVED OXYGEN DEFICIT	
Saturation Dissolved Oxygen (mg/L):	9.532
Initial Deficit (mg/L):	-0.18
5. TRAVEL TIME TO CRITICAL DO CONCENTRATION (days):	0.31
6. DISTANCE TO CRITICAL DO CONCENTRATION (miles):	5.42
7. CRITICAL DO DEFICIT (mg/L):	0.46
8. CRITICAL DO CONCENTRATION (mg/L):	9.07

APPENDIX D -- RESPONSE TO COMMENTS

No comments were received by the Department of Ecology.